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EXAMINER	
GARCIA, SANTIAGO	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/582,974	YAMAMOTO, NAOTAKE	
	Examiner	Art Unit	
	SANTIAGO GARCIA	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 10/21/10.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-6, 12-14 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-6 and 12-14 is/are rejected.

7)☒ Claim(s) 7-11 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-6 and 12-14 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-6 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Non-patent literature "Adaptive internally turbo-coded ultra wideband-impulse radio (AITC-UWB-IR) by Yamamoto N Et Al, published on May 11, 2003 in view of Bar-Ness (US 2005/0201446) and Dabak (US 2004/0008617).

As per claims 1 and 14, Yamamoto teaches, a transmitting method in an ultra-wideband communication system performing communications by sending repetitive pulse trains to a communication path, said transmitting method comprising:

assuming that m-piece pulses are transmitted per one bit of information bits (Yamamoto, II. UWB-IR, “A. Every transmitter sends Ns pulses for each data bit.” Ns pulses are equal to “m-piece pulses”.)

(“m” is a natural number not less than 2)” (Yamamoto, Intro, In the UWB-IR method systems repeats and transmits pulses per each bit.” If there is the repetition of pulses m can not be less than 1),

and that a coded rate is (k/n) ("k" is a natural number not less than 1, and "n" is a natural number not less than 2) (Yamamoto, Fig 4 shows the code rate = 1/n. In turbo coding the input has to be at least 1 and n has to be a number greater than k so in this case n can not be less than 2.);

transforming a k-bit information bit train to (k*m)-piece pulses in total (Yamamoto, Fig. 4, Where di represents each bit of k-bit information bit train. The k-bit information train goes into the turbo encoder to get encoded. The di.ns bits are the output of the turbo encoder which is the input to the UWB transmitter. The encoded bits are furthered coded with repetition block code in the turbo encoder. The di.ns then form n-piece repetitive bit trains. These repetitive bit trains then get formed into (k*m) piece pulses in total by a pulse generator inside the UWB transmitter. S tr (k) (t) is formed which is the transmitted signal of the UBW-IR system which is (k*m)-piece pulses in total.”); **and**

transmitting sequentially the (k*m)-piece pulses to the communication path (Yamamoto, Fig. 4 Out going of the UWB Transmitter. In the UWB transmitter [s tr (k) (t)] = (k*m)-piece pulses is formed which is the transmitted signal of the UBW-IR system. An impulse radio signal is composed of a number of sequential or parallel pulses),

wherein the (k*m)-piece pulses are composed of n-piece repetitive pulse trains (Yamamoto, Fig. 4 (k*m)-piece pulses the output of UWB transmitter. The di.n encoded bits are equal to n-piece bits. The di.n bits are further coded using repetition block code forming n-piece bit trains. The n-piece bit trains are transformed to n-piece pulse trains by the pulse generator inside the UWB transmitter. Impulse radio systems can deliver one or more data bits per pulse; however, impulse radio systems more typically use pulse trains, not single pulses, for each data bit. The impulse radio transmitter produces and outputs a train of pulses for each bit of information.").

Yamamoto does not clearly teach, wherein the n-piece repetitive pulse trains are composed by performing, in accordance with a state of the communication path, weighting on a plurality of encoded bits, the weighting being performed such that, for each of the encoded bits, a number of repetitive pulses allotted to the encoded bit is based on the susceptibility of the encoded bit to an adverse effect, with an encoded bit that is susceptible to the adverse effect being allotted more repetitive pulses than an encoded bit that is not susceptible to the adverse effect, thereby adaptively adjusting the number of repetitive pulses of each of the n-piece repetitive pulse trains, and wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna.

Bar-Ness teaches, **wherein the n-piece repetitive pulse trains are composed by performing, in accordance with a state of a communication path**, **weighting on a plurality**

of encoded bits (Bar-Ness, fig.4-6 and ¶[0055] “According to an aspect of the present invention, the transmitted signal (s(t)) is modulated using an optimal number of pulses per bit, Nsopt, computed by the dynamic adaptation technique. The adaptation technique utilizes channel state information in order to adopt Nsopt ” By coming up with the optimal number of pulses weighting on encoded bits is taking place, because one bit will have more pulses than another for example. See also ¶[0021], [0024], [0051-65]), **the weighting being performed such that, for each of the encoded bits, a number of repetitive pulses allotted to the encoded bit is based on the susceptibility of the encoded bit to an adverse effect** (Bar-Ness, ¶[0061] “According to those equations, if Ns is the only parameter that affects the SNR, a lower probability of error can be obtained by increasing the number of pulses per but Ns." See also ¶[0062] "...as the SNR not only depends on how many pulses per symbol Ns are transmitted" The adverse effect being a higher SNR),

with an encoded bit that is susceptible to the adverse effect being allotted more repetitive pulses than an encoded bit that is not susceptible to the adverse effect (Bar-Ness, fig.5 and 6 and ¶[0061] “According to those equations, if Ns is the only parameter that affects the SNR, a lower probability of error can be obtained by increasing the number of pulses per but Ns." See also ¶[0062] "...as the SNR not only depends on how many pulses per symbol Ns are transmitted" More pulses are being transmitted per bit the higher the SNR is, so a better BER can be achieved), **thereby adaptively adjusting the number of repetitive pulses of each of the n-piece repetitive pulse trains** (Bar-Ness, ¶[0052] “Fig.1 in accordance with the principles of the present invention utilizing the <u>dynamic adaptation</u> based on the changes in the transmission channel." The number of pulses are changed dynamically or adaptively according

to the changes in the communication channel. The radio is an UWB-IR and therefore it is inherent that repetitive pulses are transmitted), **and wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna** (Bar-Ness, ¶[0053] “The channel 430 is a wireless channel. Signals are received via an antenna arrangement (not shown in the figures) at the base station and at the mobile station” Therefore the repetitive pulse trains of the UWB-IR radio in Bar-Ness are being transmitted via an antenna).

At the time at which the invention was made it would have been obvious to one of ordinary skill in the art to modify Yamamoto with the components of Bar-Ness in the UBW-IR transceiver of fig.4.

The motivation would be to lower BER and be able to adapt to channel effects as taught by Bar-Ness in ¶[0021] and [0062].

Yamamoto in view of Bar-Ness does not clearly teach, encoding to deal with an adverse effect including interference from another user.

Dabak teaches, encoding to deal with an adverse effect including interference from another user (Dabak, ¶[0075] "One solution is to encode sufficient redundancy into the transmission so that the transmission data can be recovered if interference is below a certain threshold". See also ¶[0074] As discussed previously, wireless communications networks operating in unlicensed frequency bands have to contend with interference, whether the interference is from noise sources or **<u>from other wireless communications network</u>**" . Therefore Dabak teaches that to deal with interference (i.e. interference from noise or other wireless devices) encoding with redundancy can take place).

At the time at which the invention was made it would have been obvious to one of ordinary skill in the art to modify Yamamoto in view of Bar-Ness with Dabak to include encoding with redundancy to deal with adverse effects of other users (i.e. other wireless devices or networks) as Bar-Ness already encodes to combat noise.

The motivation would have been to be able to used unlicensed bands without interference as taught by Dabak in ¶[0074].

As per claim 2 Yamamoto teaches, a receiving method in an ultra-wideband communication system performing communications by sending repetitive pulse trains to a communication path said receiving method comprising:

receiving a transmit signal as n-piece received pulse trains (Yamamoto, Fig.4 Transmitted signal from UWB transmitter to the pulse correlator. R(t) is the received signal),

the transmit signal being n-piece repetitive pulse trains transmitted (Yamamoto, Fig.4 The UWB transmitter is transmitting n-piece repetitive pulse trains.) **after a k-bit information bit train is encoded to an n-bit encoded bit train (**Yamamoto, Fig.4 K-bit information is encoded in the turbo encoder**.) at a coded rate of (k/n) ("k" is a natural number not less than 1, and "n" is a natural number not less than 2),** (Yamamoto, Fig 4 shows the code rate = 1/n. In turbo coding the input has to be at least 1 and n has to be a number greater than k so in this case n can not be less than 2.)

and subsequently the n-bit encoded bit train is transformed to the n-piece repetitive pulse trains; (Yamamoto, Fig.4 Output of the UWB transmitter is the transmitted signal composed of repetitive pulse trains.)

outputting number of repetitive pulses composing each of the n-piece received pulse trains, (Yamamoto, Fig. 4 UWB transmitter is outputting the pulse trains comprising of n-piece pulse trains which are then transmitted therefore received pulses by the receiver by the pulse correlator.)

based on pulse train information or bit train information received beforehand; (Yamamoto, Fig.4 Bit train information is coming out of Turbo encoder then going into the UWB transmitter to form pulse train information which then the pulse train information is the output of the UWB transmitter.)

correlating individually pulses composing the n-piece received pulse trains (Yamamoto, Fig.4 Pulse correlator receives the n-piece pulse trains which are then correlated by the pulse correlator.**) with a predetermined template wave shape,** (Yamamoto, Fig.2 shows the predetermined wave shape. Fig.2 shows the template signal for the typical received waveform in Fig.1. Fig. 3 also shows the normalized signal correlation function.) **thereby outputting correlation values;**(Yamamoto, Fig.4 output of pulse train correlator.) **thereby providing n-piece integrated values;**(Yamamoto, Fig.4 Output of pulse train integrator.) **making soft decision for the n-piece received pulse trains** (Yamamoto, Fig.4 The turbo decoder is able to make the soft decision. The output of the pulse train integrator goes into the turbo decoder.) **based on the n-piece integrated values, thereby outputting the soft decision results for n bits;**(Yamamoto, Fig.4 The turbo decoder is receiving the integrated values and making the soft

decision resulting in n bits which is the out put of the decoder.) **and making hard decision in decoding** (Yamamoto, Fig.4 Hard decision unit is making the hard decision.) **for the n-piece received pulse trains based on the soft decision results for n bits**,(Yamamoto, Fig.4 Input of the turbo decoder is n bits coming from the output of the pulse train integrator. Therefore the n-piece received pulse trains results in n bits.) **thereby outputting the k-bit information bit train as a decoded information signal.** (Yamamoto, Fig.4 output of hard decision block.).

Yamamoto does not clearly teach, wherein the n-piece repetitive pulse trains are composed by performing, in accordance with a state of the communication path, weighting on a plurality of encoded bits, the weighting being performed such that, for each of the encoded bits, a number of repetitive pulses allotted to the encoded bit is based on the susceptibility of the encoded bit to an adverse effect, with an encoded bit that is susceptible to the adverse effect being allotted more repetitive pulses than an encoded bit that is not susceptible to the adverse effect, thereby adaptively adjusting the number of repetitive pulses of each of the n-piece repetitive pulse trains, and wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna.

Bar-Ness teaches, **wherein the n-piece repetitive pulse trains are composed by performing, in accordance with a state of a communication path**, **weighting on a plurality of encoded bits** (Bar-Ness, fig.4-6 and ¶[0055] "According to an aspect of the present invention, the transmitted signal (s(t)) is modulated using an optimal number of pulses per bit, Nsopt, computed by the dynamic adaptation technique. The adaptation technique utilizes channel state information in order to adopt Nsopt " By coming up with the optimal number of pulses

weighting on encoded bits is taking place, because one bit will have more pulses than another for example. See also ¶[0021], [0024], [0051-65]), **the weighting being performed such that, for each of the encoded bits, a number of repetitive pulses allotted to the encoded bit is based on the susceptibility of the encoded bit to an adverse effect** (Bar-Ness, ¶[0061] "According to those equations, if Ns is the only parameter that affects the SNR, a lower probability of error can be obtained by increasing the number of pulses per but Ns." See also ¶[0062] "...as the SNR not only depends on how many pulses per symbol Ns are transmitted" The adverse effect being a higher SNR),

with an encoded bit that is susceptible to the adverse effect being allotted more repetitive pulses than an encoded bit that is not susceptible to the adverse effect (Bar-Ness, fig.5 and 6 and ¶[0061] "According to those equations, if Ns is the only parameter that affects the SNR, a lower probability of error can be obtained by increasing the number of pulses per but Ns." See also ¶[0062] "...as the SNR not only depends on how many pulses per symbol Ns are transmitted" More pulses are being transmitted per bit the higher the SNR is, so a better BER can be achieved), **thereby adaptively adjusting the number of repetitive pulses of each of the n-piece repetitive pulse trains** (Bar-Ness, ¶[0052] "Fig.1 in accordance with the principles of the present invention utilizing the dynamic adaptation based on the changes in the transmission channel." The number of pulses are changed dynamically or adaptively according to the changes in the communication channel. The radio is an UWB-IR and therefore it is inherent that repetitive pulses are transmitted), **and wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna** (Bar-Ness, ¶[0053] "The channel 430 is a wireless channel. Signals are received via an antenna arrangement (not shown in

the figures) at the base station and at the mobile station" Therefore the repetitive pulse trains of the UWB-IR radio in Bar-Ness are being transmitted via an antenna).

At the time at which the invention was made it would have been obvious to one of ordinary skill in the art to modify Yamamoto with the components of Bar-Ness in the UBW-IR transceiver of fig.4.

The motivation would be to lower BER and be able to adapt to channel effects as taught by Bar-Ness in ¶[0021] and [0062].

Yamamoto in view of Bar-Ness does not clearly teach, encoding to deal with an adverse effect including interference from another user.

Dabak teaches, encoding to deal with an adverse effect including interference from another user (Dabak, ¶[0075] "One solution is to encode sufficient redundancy into the transmission so that the transmission data can be recovered if interference is below a certain threshold". See also ¶[0074] As discussed previously, wireless communications networks operating in unlicensed frequency bands have to contend with interference, whether the interference is from noise sources or **<u>from other wireless communications network</u>**" . Therefore Dabak teaches that to deal with interference (i.e. interference from noise or other wireless devices) encoding with redundancy can take place).

At the time at which the invention was made it would have been obvious to one of ordinary skill in the art to modify Yamamoto in view of Bar-Ness with Dabak to include encoding with redundancy to deal with adverse effects of other users (i.e. other wireless devices or networks) as Bar-Ness already encodes to combat noise.

The motivation would have been to be able to used unlicensed bands without interference as taught by Dabak in ¶[0074].

As for claim 3, Yamamoto teaches, **a transmitting device usable in an ultra-wideband communication system performing communications by sending repetitive pulse trains to a communication path, said transmitting device comprising:**

an encoder operable to encode a k-bit information bit train (Yamamoto, Fig.4 Multiple dis represent k-bit information bit trains which then are the input of the Turbo encoder) **to an n-bit encoded bit train** (Yamamoto, Fig.4) **at a coded rate of (k/n) ("k" is a natural number not less than 1, and "n" is a natural number not less than 2),** (Yamamoto, Fig 4 shows the code rate = 1/n. In turbo coding the input has to be at least 1 and n has to be a number greater than k so in this case n can not be less than 2.) **on condition that m-piece pulses are transmitted per one bit of information bits** (Yamamoto, II. UWB-IR, "A. Every transmitter sends Ns pulses for each data bit." Ns pulses are equal to "m-piece pulses".)

("m" is a natural number not less than 2) (Yamamoto, Intro, In the UWB-IR method systems repeats and transmits pulses per each bit." If there is the repetition of pulses m can not be less than 1) **and the coded rate is (k/n);** (Yamamoto, Fig 4 shows the code rate = 1/n. In turbo coding the input has to be at least 1 and n has to be a number greater than k so in this case n can not be less than 2.) **and a transmitting unit operable to generate n-piece repetitive pulse trains** (Yamamoto, Fig 4 UWB transmitter can generate n-piece repetitive pulse trains.) **based on the n-bit encoded bit train encoded by said encoder,** (Yamamoto, Fig 4 The output of turbo encoder produces the n-bit encoded bit train then that bit train goes into the UBW therefore

it is based on n-bit encoded bit train.) **thereby transmitting sequentially the n-piece repetitive pulse trains to the communication path,** (Yamamoto, Fig 4 The UWB transmitter is transmitting the n-piece repetitive pulse trains to the communication path. An impulse radio signal is composed of a number of sequential or parallel pulses.) **wherein pulses included in the n-piece repetitive pulse trains transmitted by said transmitting unit amount to (k*m) pieces in total,** (Yamamoto, Fig. 4, Where di represents each bit of k-bit information bit train. The k-bit information train goes into the turbo encoder to get encoded. The di.ns bits are the output of the turbo encoder which is the input to the UWB transmitter. The encoded bits are furthered coded with repetition block code in the turbo encoder. The di.ns then form n-piece repetitive bit trains. These repetitive bit trains then get formed into (k*m) piece pulses in total by a pulse generator inside the UWB transmitter. S tr (k) (t) is formed which is the transmitted signal of the UBW-IR system which is (k*m)-piece pulses in total.") **.**

Yamamoto does not clearly teach, wherein the n-piece repetitive pulse trains are composed by performing, in accordance with a state of the communication path, weighting on a plurality of encoded bits, the weighting being performed such that, for each of the encoded bits, a number of repetitive pulses allotted to the encoded bit is based on the susceptibility of the encoded bit to an adverse effect, with an encoded bit that is susceptible to the adverse effect being allotted more repetitive pulses than an encoded bit that is not susceptible to the adverse effect, thereby adaptively adjusting the number of repetitive pulses of each of the n-piece repetitive pulse trains, and wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna.

Bar-Ness teaches, **wherein the n-piece repetitive pulse trains are composed by performing, in accordance with a state of a communication path, weighting on a plurality of encoded bits** (Bar-Ness, fig.4-6 and ¶[0055] “According to an aspect of the present invention, the transmitted signal (s(t)) is modulated using an optimal number of pulses per bit, Nsopt, computed by the dynamic adaptation technique. The adaptation technique utilizes channel state information in order to adopt Nsopt ” By coming up with the optimal number of pulses weighting on encoded bits is taking place, because one bit will have more pulses than another for example. See also ¶[0021], [0024], [0051-65]), **the weighting being performed such that, for each of the encoded bits, a number of repetitive pulses allotted to the encoded bit is based on the susceptibility of the encoded bit to an adverse effect** (Bar-Ness, ¶[0061] “According to those equations, if Ns is the only parameter that affects the SNR, a lower probability of error can be obtained by increasing the number of pulses per but Ns." See also ¶[0062] "...as the SNR not only depends on how many pulses per symbol Ns are transmitted" The adverse effect being a higher SNR),

with an encoded bit that is susceptible to the adverse effect being allotted more repetitive pulses than an encoded bit that is not susceptible to the adverse effect (Bar-Ness, fig.5 and 6 and ¶[0061] “According to those equations, if Ns is the only parameter that affects the SNR, a lower probability of error can be obtained by increasing the number of pulses per but Ns." See also ¶[0062] "...as the SNR not only depends on how many pulses per symbol Ns are transmitted" More pulses are being transmitted per bit the higher the SNR is, so a better BER can be achieved), **thereby adaptively adjusting the number of repetitive pulses of each of the n-piece repetitive pulse trains** (Bar-Ness, ¶[0052] “Fig.1 in accordance with the principles

of the present invention utilizing the dynamic adaptation based on the changes in the transmission channel." The number of pulses are changed dynamically or adaptively according to the changes in the communication channel. The radio is an UWB-IR and therefore it is inherent that repetitive pulses are transmitted), **and wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna** (Bar-Ness, ¶[0053] “The channel 430 is a wireless channel. Signals are received via an antenna arrangement (not shown in the figures) at the base station and at the mobile station” Therefore the repetitive pulse trains of the UWB-IR radio in Bar-Ness are being transmitted via an antenna).

At the time at which the invention was made it would have been obvious to one of ordinary skill in the art to modify Yamamoto with the components of Bar-Ness in the UBW-IR transceiver of fig.4.

The motivation would be to lower BER and be able to adapt to channel effects as taught by Bar-Ness in ¶[0021] and [0062].

Yamamoto in view of Bar-Ness does not clearly teach, encoding to deal with an adverse effect including interference from another user.

Dabak teaches, encoding to deal with an adverse effect including interference from another user (Dabak, ¶[0075] "One solution is to encode sufficient redundancy into the transmission so that the transmission data can be recovered if interference is below a certain threshold". See also ¶[0074] As discussed previously, wireless communications networks operating in unlicensed frequency bands have to contend with interference, whether the interference is from noise sources or **from other wireless communications network**" .

Therefore Dabak teaches that to deal with interference (i.e. interference from noise or other wireless devices) encoding with redundancy can take place).

At the time at which the invention was made it would have been obvious to one of ordinary skill in the art to modify Yamamoto in view of Bar-Ness with Dabak to include encoding with redundancy to deal with adverse effects of other users (i.e. other wireless devices or networks) as Bar-Ness already encodes to combat noise.

The motivation would have been to be able to used unlicensed bands without interference as taught by Dabak in ¶[0074].

As per claim 4, Yamamoto in view of Bar-Ness and Dabak teaches, the transmitting device as defined in claim 3, further comprising:

a transmitting control unit operable to generate control information on number of the repetitive pulses included in each train of the n-piece repetitive pulse trains transmitted by said

transmitting unit (Bar-Ness, fig.4 Adaptation Algorithm unit 412 represents the control unit to alter n-piece repetitive pulse trains).

As per claim 5, Yamamoto in view of Bar-Ness and Dabak teaches, **the transmitting device as defined in claim 4, wherein said transmitting control unit is operable to acquire communication path information on the communication path, thereby generating the control information based on the acquired communication path information** (Bar-Ness, ¶[0061] "According to those equations, if Ns is the only parameter that affects the SNR, a lower

probability of error can be obtained by increasing the number of pulses per but Ns." See also ¶[0062] "...as the SNR not only depends on how many pulses per symbol Ns are transmitted" The communication path information is SNR, and the control would be controlling the number of pulses per bit according to the measure of the SNR).

As per claim 6, Yamamoto in view of Bar-Ness and Dabak teaches, the transmitting device as defined in claim 4, wherein said transmitting control unit comprises:

a pulse generator operable (Yamamoto, fig.4 inherently would have to have a pulse generator), **in accordance with the control information generated by said transmitting control unit** (Bar-Ness, fig.4 412 generates Nsopt which is sent to Adaptive Modulator), **to repetitively generate a plurality of pulses for each encoded bit of the n-bit encoded bit train encoded by said encoder, thereby outputting the n-piece repetitive pulse trains** (Yamamoto, Fig.4 The turbo encoder also uses repetition code. Meaning if the encoded bit is 0 the code could be 000. By having the repetitive bit trains which are formed by using repetition code going into the pulse generator of the UWB transmitter the system is transmitting a plurality of pulses predetermined per kind of bit if each encoded bit 0 or 1) , **the plurality of pulses being predetermined according to a kind of each encoded bit** (Bar-Ness, fig.4 data buffer is storing information on how many pulses per bit depending on the channel conditions. Also see fig.6 element 605, since it is storing the Nsopt then the pulses are being predetermined according to each kind of bit, 0 or 1).

As per claim 12 Yamamoto teaches, A receiving device usable in an ultra-wideband communication system performing communications by sending repetitive pulse trains to a communication path, said receiving device comprising:

a receiving unit operable to receive a transmit signal as n-piece received repetitive pulse trains, (Yamamoto, Fig.4 Transmitted signal from UWB transmitter to the pulse correlator. R(t) is the received signal.)

the transmit signal being n-piece repetitive pulse trains transmitted after a k-bit information bit train is encoded (Yamamoto, Fig.4 The UWB transmitter is transmitting n-piece repetitive pulse trains. K-bit information is encoded in the turbo encoder**.) to an n-bit encoded bit train at a coded rate of (k/n) ("k" is a natural number not less than 1, and "n" is a natural number not less than 2),** (Yamamoto, Fig 4 shows the code rate = 1/n. In turbo coding the input has to be at least 1 and n has to be a number greater than k so in this case n can not be less than 2.)

and subsequently the n-bit encoded bit train is transformed to the n-piece repetitive pulse trains (Yamamoto, Fig. 4 Output of the UWB transmitter is the transmitted signal which is repetitive pulse trains); a pulse wave-shape correlator operable to correlate individually pulses (Yamamoto, Fig. 4 Pulse correlator.) **composing the n-piece received repetitive pulse trains with a predetermined template wave shape** (Yamamoto, Fig.2 shows the predetermined wave shape. Fig.2 shows the template signal for the typical received waveform in Fig.1), thereby outputting n-piece repetitive correlation value trains in correspondence with the n-piece received repetitive pulse trains; (Yamamoto, Fig.4 Output of the pulse correlator corresponds to received repetitive pulse trains before hand.) **based on pulse train information or bit train information**

received beforehand (Yamamoto, Fig.4 The pulse trains information is being transmitted by the UBW transmitter. At the same time those pulses are representing the bit trains as well.) n-piece repetition numbers for the n-piece repetitive correlation value trains outputted by said pulse wave-shape correlator; (Yamamoto, Fig.4 Output of the correlator.) **an integrator operable to divide into n intervals the n-piece repetitive correlation value trains outputted by said pulse wave-shape correlator, n-piece repetition numbers for the n-piece repetitive correlation value trains outputted by said pulse wave-shape correlator** (Yamamoto, Fig.4 Pulse train integrator.) and to integrate the n-piece repetitive correlation value trains for each divided interval, (Yamamoto, Fig.4 Pulse train integrator) **thereby outputting n-piece integrated values** (Yamamoto, Fig.4 Output of the pulse train integrator.); **a decoder operable to make soft decision for the n-piece received repetitive pulse trains** (Yamamoto, Fig.4 Turbo decoder) based on the n-piece integrated values outputted by said integrator (Yamamoto, Fig.4 The output of the integrator.), **thereby outputting the soft decision results for n bits** (Yamamoto, Fig.4 Output of the turbo decoder.); **and a decision unit operable to make hard decision in decoding for the n-piece received pulse trains** (Yamamoto, Fig.4 Hard decision block) **based on the soft decision results for n bits outputted by said decoder** (Yamamoto, Fig.4 the soft decision is going into the hard decision block.), **thereby outputting the k-bit information bit train as a decoded information signal** (Yamamoto, Fig.4 Output of the hard decision block).

Yamamoto does not clearly teach, wherein the n-piece repetitive pulse trains are composed by performing, in accordance with a state of the communication path, weighting on a plurality of encoded bits, the weighting being performed such that, for each of the encoded bits, a number of repetitive pulses allotted to the encoded bit is based on the susceptibility of the

encoded bit to an adverse effect, with an encoded bit that is susceptible to the adverse effect being allotted more repetitive pulses than an encoded bit that is not susceptible to the adverse effect, thereby adaptively adjusting the number of repetitive pulses of each of the n-piece repetitive pulse trains, and wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna; and a receiving control unit operable to output, based on pulse train information or bit train information received beforehand, n-piece repetition numbers for the n-piece repetitive correlation value trains outputted by said pulse wave-shape correlator.

Bar-Ness teaches, **wherein the n-piece repetitive pulse trains are composed by performing, in accordance with a state of a communication path**, **weighting on a plurality of encoded bits** (Bar-Ness, fig.4-6 and ¶[0055] “According to an aspect of the present invention, the transmitted signal (s(t)) is modulated using an optimal number of pulses per bit, Nsopt, computed by the dynamic adaptation technique. The adaptation technique utilizes channel state information in order to adopt Nsopt ” By coming up with the optimal number of pulses weighting on encoded bits is taking place, because one bit will have more pulses than another for example. See also ¶[0021], [0024], [0051-65]), **the weighting being performed such that, for each of the encoded bits, a number of repetitive pulses allotted to the encoded bit is based on the susceptibility of the encoded bit to an adverse effect** (Bar-Ness, ¶[0061] “According to those equations, if Ns is the only parameter that affects the SNR, a lower probability of error can be obtained by increasing the number of pulses per but Ns." See also ¶[0062] "...as the SNR not only depends on how many pulses per symbol Ns are transmitted" The adverse effect being a higher SNR),

with an encoded bit that is susceptible to the adverse effect being allotted more repetitive pulses than an encoded bit that is not susceptible to the adverse effect (Bar-Ness, fig.5 and 6 and ¶[0061] "According to those equations, if Ns is the only parameter that affects the SNR, a lower probability of error can be obtained by increasing the number of pulses per but Ns." See also ¶[0062] "...as the SNR not only depends on how many pulses per symbol Ns are transmitted" More pulses are being transmitted per bit the higher the SNR is, so a better BER can be achieved), **thereby adaptively adjusting the number of repetitive pulses of each of the n-piece repetitive pulse trains** (Bar-Ness, ¶[0052] "Fig.1 in accordance with the principles of the present invention utilizing the dynamic adaptation based on the changes in the transmission channel." The number of pulses are changed dynamically or adaptively according to the changes in the communication channel. The radio is an UWB-IR and therefore it is inherent that repetitive pulses are transmitted), **and wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna** (Bar-Ness, ¶[0053] "The channel 430 is a wireless channel. Signals are received via an antenna arrangement (not shown in the figures) at the base station and at the mobile station" Therefore the repetitive pulse trains of the UWB-IR radio in Bar-Ness are being transmitted via an antenna); and

and a receiving control unit operable to output (Bar-Ness, fig.4 421 adaptive modulator in the Rx represents a receiving control unit), **based on pulse train information or bit train information received beforehand** (Bar-Ness, fig.4 Ns is the information received before hand).

At the time at which the invention was made it would have been obvious to one of ordinary skill in the art to modify Yamamoto with the components of Bar-Ness in the UBW-IR transceiver of fig.4.

The motivation would be to lower BER and be able to adapt to channel effects as taught by Bar-Ness in ¶[0021] and [0062].

Yamamoto in view of Bar-Ness does not clearly teach, encoding to deal with an adverse effect including interference from another user.

Dabak teaches, encoding to deal with an adverse effect including interference from another user (Dabak, ¶[0075] "One solution is to encode sufficient redundancy into the transmission so that the transmission data can be recovered if interference is below a certain threshold". See also ¶[0074] As discussed previously, wireless communications networks operating in unlicensed frequency bands have to contend with interference, whether the interference is from noise sources or **from other wireless communications network**" . Therefore Dabak teaches that to deal with interference (i.e. interference from noise or other wireless devices) encoding with redundancy can take place).

At the time at which the invention was made it would have been obvious to one of ordinary skill in the art to modify Yamamoto in view of Bar-Ness with Dabak to include encoding with redundancy to deal with adverse effects of other users (i.e. other wireless devices or networks) as Bar-Ness already encodes to combat noise.

The motivation would have been to be able to used unlicensed bands without interference as taught by Dabak in ¶[0074].

Regarding claim 13, which inherits the limitations of claim 1 and 12, the claimed method including the features corresponds to subject matter mentioned in the rejection of claims 1 and 12 is applicable hereto.

Allowable Subject Matter

3. Claim 7-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SANTIAGO GARCIA whose telephone number is (571)270-5182. The examiner can normally be reached on MONDAY- FRIDAY 7:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SG/

/CHIEH M FAN/

Supervisory Patent Examiner, Art Unit 2611